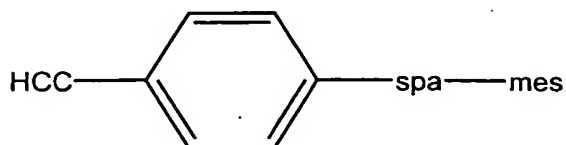


**CLAIMS**

1. A liquid crystalline polyacetylene having a repeat structure of the formula

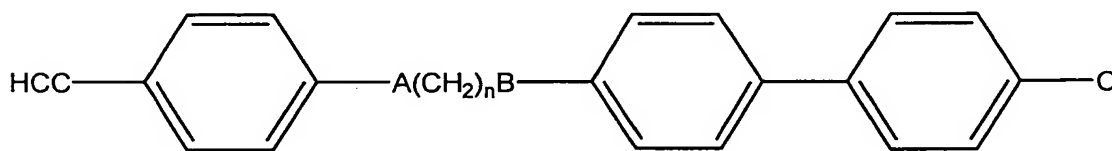


where spa is a spacer group and mes is a mesogenic substituent.

2. A polymer according to claim 1 in which the mesogenic substituent comprises a substituted biphenyl group.

3. A polymer according to claim 1 in which the spacer group comprises an alkyl chain.

4. A polymer according to claim 3 having a repeat structure of the formula



where: n is greater than 1; and A, B and C are polar moieties.

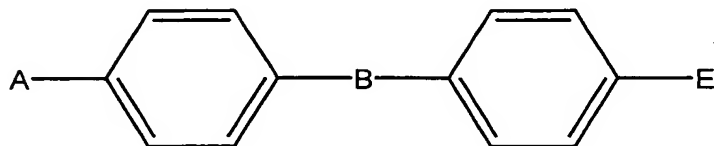
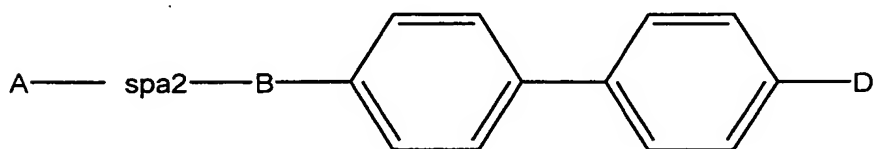
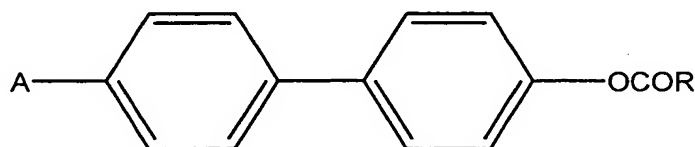
5. A polymer according to claim 4 in which A is selected from the group consisting of COO, OCO and O; B is selected from the group consisting of COO, OCO and O; and C is selected from the group consisting of CN, OH, CO<sub>2</sub>H, OR, CO<sub>2</sub>R or OCOR where R is an alkyl group.

6. A polymer according to claim 5 in which A is COO, B is OCO and C is  $O(CH_2)_6CH_3$ .

7.  $Poly \{ [4 - ( \{ [6 - ( \{ [4' - (heptyl)oxy - 4 - biphenyl]carbonyl \} oxy)hexyl \} oxy \} carbonyl)phenyl]acetylene \}$ .

8.  $[4 - ( \{ [6 - ( \{ [4' - (heptyl)oxy - 4 - biphenyl]carbonyl \} oxy)hexyl \} oxy \} carbonyl)phenyl]acetylene$ .

9. A substituted acetylene having the formula  $HC \equiv C - spa1 - mes$ , where spa1 is a spacer group and mes is a mesogenic substituent selected from the group consisting of:



wherein A, B and D are polar moieties, E is a polar moiety which is not cyano or methoxy, spa2 is a spacer group, and R is H or an alkyl group.

10. An acetylene according to claim 9 in which spa1 and/or spa2 comprises an alkyl chain.
11. An acetylene according to claim 9 in which A and B are selected from the group consisting of: OCO, COO and O.
12. An acetylene according to claim 9 in which E is selected from the group consisting of: OH, CO<sub>2</sub>H, O (CH<sub>2</sub>)<sub>m-1</sub> CH<sub>3</sub>, OCO (CH<sub>2</sub>)<sub>m-1</sub> CH<sub>3</sub>, and CO<sub>2</sub> (CH<sub>2</sub>)<sub>m-1</sub> CH<sub>3</sub> where m is greater than one.
13. An acetylene according to claim 9 in which D is selected from the group consisting of : CN, OH, CO<sub>2</sub>H, OR', COOR' and where R' is an alkyl group.
14. 5-{{{(4'-{[(undecyl)carbonyl]oxy}-biphenyl-4-yl)carbonyl]oxy}-1-pentyne.
15. 6-{{{(4'-{[(undecyl)carbonyl]oxy}-biphenyl-4-yl)carbonyl]oxy}-1-hexyne.
16. 5-[(4'-{[(undecyl)carbonyl]oxy}-biphenyl-4-yl)oxy]-1-pentyne.
17. 4-{{{[(4'-[(nonyl)oxy]-biphenyl-4-yl)carbonyl]oxy}hexyl]oxy}carbonyl}-1-butyne.
18. 10-{{{[(4'-[(nonyl)oxy]-biphenyl-4-yl)carbonyl]oxy}hexyl]oxy}carbonyl}-1-decyne.
19. 5-{{{[(4'-[(hexyl)oxy]-biphenyl-4-yl)oxy]hexyl}oxy}carbonyl]-1-pentyne.

20. 10-[[{[(4'[(hexyl)oxy]-biphenyl-4-yl)oxy]hexyl}oxy)carbonyl]-1-decyne.
21. 5-({[(4-{[(hexyl)oxy]phenyl}oxy)carbonyl]phenyl}oxy)-1-pentyne.
22. A polyacetylene polymer polymerised from a substituted acetylene monomer according to claim 9.
23. A liquid crystalline polyacetylene polymerised from a substituted acetylene monomer according to claim 9.
24. An acetylene according to claim 9 in liquid crystalline.